The Builder.

No. CCLXI.

SATURDAY, FEBRUARY 5, 1848.

ON Monday morning last, at half-past ten o'clock, the committee-room at the Euston-square station of the London and North-Western Railway was crowded with persons interested in architecture and building, to hear the inquiry into the cause of the late disastrous accident there,—an inquiry most improperly and unwisely omitted, as we felt it our duty to point out, in the first instance. Besides Mr. Hardwick, the company's architect, and Mr. Sheriff Cubitt, the parties more immediately concerned, Professor Hosking attended on the part of the Government (in accordance with a request for such assistance forwarded by the jury), and Mr. Braithwaite, the engineer, was there in pursuance of a summons from Mr. Wakley, the coroner. Mr. S. Angell, Mr. E. Blore, Mr. Higgins, Mr. Poynter, Mr. Shaw, and Mr. Tite, with Mr. Grimsdell, and other well-known builders, were also present. The jury first, and Mr. Hosking and Mr. Braithwaite afterwards, having viewed the scene of the accident, the inquiry was commenced, and was continued with the greatest care and patience till nearly four o'clock, offering a very marked contrast with the former proceedings.

Mr. Hardwick, assisted by his son, on whom the superintendence of the works had chiefly devolved, was examined at great length, and described the construction of the northern inclosure of the new vestibule which fell, by means of the working plan and sections. This description we will endeavour briefly to convey to our readers, even at the risk of repetition, as it unquestionably entails matter for consideration. The wall was carried on four pairs of columns, one column immediately behind another, not side by side, standing on pedestals. Springing from the top of the columns, which were tied together by iron tension-bars, were flat arches, with a tier of York landings and brickwork to form the entablature, and on these, over the inner line of columns only, rose the inclosing wall, 2 feet 8 inches thick, to a height, as nearly as we could ascertain, including the entablature, of 24 feet, with a series of openings in it for windows. The back columns, it will be seen, thus took only a small portion of the weight. The columns were formed of bricks *on edge* in cement, 2 feet 2½ inches in diameter at bottom (not 2 feet 4 inches, as before stated), 1 foot 10½ inches in diameter at top, and 20 feet high. The pedestals 4 feet 6 inches high, something wider on the face than the lowest diameter of the column, and 6 feet 8 inches in depth (or thickness), were built in mortar. Below these pedestals were brick piers, with two tiers of arches to connect them, carried up from a solid bed of concrete through the ground-floor and basement beneath the vestibule, a height of perhaps 30 feet. These piers had ten courses of footings in five sets off, and were 5 feet 2 inches wide and 7 feet 4 inches in depth (or thickness). Thus, to recapitulate, there were, first, the piers and arches in basement story; the piers continued up, and arches in the ground-floor; the pedestals and columns above these piers (commencing at the intended level of the floor of the vestibule); their entablature and the wall above,—a height in the whole, from the top of concrete, of, say 80 feet. The mischief is confined to the part above the line of intended floor of vestibule: the pedestals for the most part stand, but are splintered off from the top; all above fell. Having premised thus much, we give some minutes of Mr. Hardwick's further evidence:—

"Messrs. Cubitt were the contractors for the works, from my designs. Originally a time was fixed for the completion of the works, but, in consequence of a large addition to the contract, the stipulation as to time was altogether dispensed with. The original contract was that the works should be finished about the spring of 1848, but the additional works would require at least six or eight months' more time; and the general understanding simply was, that Messrs. Cubitt should proceed with the works as fast as was necessary. The work which fell down was a portion of the additional work, and not included in the original contract. The materials were specified to be of the very best—the best bricks, the best stone lime, the best Thames sand. The foundation of the works had not been examined since the accident. It had not been ascertained that any of the concrete had been displaced. The substratum of the brickwork was as sound now as when first erected. It was an enormous foundation for such a building. He was satisfied that the fall was not occasioned by any thing which occurred with regard to the concrete or to the substratum of work. He had never any reason to complain either of the work or of the materials, nor did he know that his clerk of the works had ever done so. He (Mr. Hardwick) had never calculated the amount of loss sustained by the accident; it could not be above 120*l.* or 130*l.* He had never thought on whom the loss was to fall; he should suppose Messrs. Cubitt would make the work good. The loss would certainly not fall on the Company; they were blameless. There had not been any discussion with Messrs. Cubitt upon the subject. If the loss had been thousands, it might have been of importance; but being so small, he presumed it would not be made a matter of consideration.

Mr. Wakley—I shall ask Mr. Cubitt presently whether he agrees to build the work up again. Englishmen very seldom bear a loss of that kind unless they consider they are in the wrong.

Mr. Hardwick did not consider there was blame to be attached anywhere.

Mr. Wakley—There is none imputed. The object of the inquiry is to avoid a similar occurrence.

Mr. Hardwick—All I can say is, that if Messrs. Cubitt will not pay for it, I will, for I should be ashamed for such a question to go before the board.

Mr. Wakley—Have you yourself formed an opinion as to the cause of the fall?

Mr. Hardwick—My first impression was, that in consequence of our having gone on with the works as fast as it was possible the works could go on, the cement of the columns had not sufficiently set, though when we proceeded with the works we believed it had. The work was entirely green work, and liable from a little pressure to accident. It was a bad time of the year. The columns were constructed in November, when the weather was wet and damp. If the work had taken place in spring, no accident in all probability would have occurred. No complaint was made that the works were carried up too fast. One justification for expediting the work was the general inconvenience the public experienced from the want of additional accommodation. It was necessary cement should be used immediately after it was prepared. By being left long its adhesiveness was destroyed, and it became crumbly. A column of 2 ft. 2½ in. in diameter admitted of solid brickwork. There ought not to be any interstices, but if there were they would be filled up with cement. The columns were begun to be built with the bricks lying flat, but soon after the plan was changed, and the bricks were laid on their edges. Roman cement was used. There was no specified proportion between cement and sand. When the cement was good, the union produced between it and brick was as firm as stone. The substance became a perfectly indurated mass. No specification was made as to the mode of laying the bricks, whether flat or on edge. To the architect the difference was of little moment, because the principle of constructing a column was, that it ought to be one solid mass of material formed of brick and cement. If the cement was not good and the combination well formed between it and the bricks, the column would not be safer by the bricks being laid flat instead of on the edge. The danger would be the same. In using the bricks on the edge there was less cutting of the brickwork than in using the bricks flat. He could not at the moment remember any building constructed in a similar manner, but brick columns were very common. He had built a great many brick columns, but he had never had his attention particularly drawn to the subject, he always having trusted to the judgment of the workmen.

By a Juryman.—The columns were entirely crushed by the weight of the brickwork above falling. The general work was to be partly mortar and partly cement, but the columns were to be all cement. He had inspected them, and found them all cement and brick, but the cement was not in some portions of them sufficiently set. In saying this he did not mean that there was danger from pressure, but that it was likely the work might receive a lateral injury from the scaffolding, or some such thing. For example, since he had made his report upon the subject, it had been felt that the work might have been affected in some degree by the removal of the scaffolding. The scaffolding was carried to a very great height above the wall. In the course of the construction the ledgers of the scaffolding were placed close against the columns. The least movement of that scaffolding would have the effect of bending the column to which the ledger was attached. If the work had been done in the month of May or of April it would have set in a few days, but in this part of the year it would not set for several weeks. Men were employed during the morning of the accident in making some alteration in the scaffolding at the top: it was quite possible, therefore, that a movement might have taken place. The cement not being set, the slightest lateral thrust upon the columns would occasion the accident. How much greater must have been the effect of removing the whole of the scaffolding! The height of the scaffolding was so great, that it afforded a lever of enormous power when the movement took place at the very top, and this might account for the occurrence of an accident.

Mr. W. Cubitt, when examined, confirmed the statement that no time had been stipulated for the performance of that part of the work which fell: he knew of no deviation from the specification: had never doubted the goodness of the design. As to the cause of the accident, he felt ashamed to say he could not arrive at a satisfactory conclusion: he did not think the scaffolding had any thing whatever to do with it. Believed that the columns eventually would have carried all the weight; and that, if the period of the year had been more favourable, the work might have been done safely in half the time which they had occupied in doing it. When examined as to the necessity of using cement fresh for such work as the columns, Mr. Cubitt said,—It is of great importance that the cement should be used at a proper period, but what that is depends much upon the nature of the cement: in 20 casks, had from one manufactory, several of them will differ from the others. Sometimes the cement requires time before it is used, otherwise it sets so rapidly as to prevent its closing up the bricks properly. Cement, when it is very fresh and new, hardens instantly, but it does not take the character of stone for a very considerable time; and that which is used fresh is less likely to do so than cement which has been kept a little time. By the touch is the best mode of judging of it, and not the eye. His workmen were picked men, and under-